



UCSC

University of Colombo, Sri Lanka

University of Colombo School of Computing



**DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY
(EXTERNAL)**

Academic Year 2024— 2nd Year Examination — Semester 4

IT4506 — Computer Networks

Part 1 - Multiple Choice Question Paper
(2 Hours for both Part 1 and Part 2)

Important Instructions

- This paper has **two (2) parts, Part 1 and Part 2**.
- The total duration of **both Part 1 and Part 2 is 2 hours**.
- The final mark for the paper will be determined by averaging the scores of Part 1 and Part 2, each of which is graded out of **100**.
- The medium of instructions and questions is English.
- This paper (Part 1) has **25 MCQ questions** on **6 pages**. Answer **all** questions.
- Each question will have **5 (five)** choices with **ONLY ONE** correct answer.
- Answers should be marked on the **special answer sheet** provided.
- Note that questions appear on both sides of the paper. If a page or part of a page is not printed, please inform the supervisor/invigilator immediately.
- Mark the correct choices on the question paper first and then transfer them to the given answer sheet which will be machine marked. **Please completely read and follow the instructions given on the other side of the answer sheet before you shade your correct choices.**
- Any electronic device capable of storing and retrieving text, including electronic dictionaries, smartwatches, and mobile phones, is **not** allowed.
- Calculators are **not allowed**.
- *All Rights Reserved.* This question paper can NOT be used without proper permission from the University of Colombo School of Computing.

- 1). The International Organisation for Standardisation (ISO) proposed a foundational reference model for network communication. Which of the following options identifies this model?

- (a) TCP/IP Reference Model
- (b) Open System Interconnection Reference Model
- (c) Three-tier Reference Model
- (d) Four-layer architecture
- (e) Five-layer architecture

- 2). What is the layer responsible for handling the physical transmission of data between adjacent network nodes on the same network segment in the TCP/IP model?

- | | | |
|--------------------|--------------------|---------------|
| (a) Physical Layer | (b) Internet Layer | (c) TCP Layer |
| (d) Link Layer | (e) Session Layer | |

- 3). What networking device facilitates connections between two or more distinct networks?

- | | | |
|-----------|------------------|-------------|
| (a) Hub | (b) Access point | (c) Gateway |
| (d) Modem | (e) Firewall | |

- 4). Which technique allows for the flexible distribution of network bandwidth among hosts in response to fluctuating short-term demands?

- (a) Time Division Multiplexing (TDM)
- (b) Resource Division Multiplexing (RDM)
- (c) Frequency Division Multiplexing (FDM)
- (d) Statistical Multiplexing
- (e) Scheduled Multiplexing

- 5). The Medium Access Control (MAC) sublayer plays a crucial role in managing broadcast network issues. In which layer of the reference model proposed by ISO is this sublayer located?

- | | | |
|-----------------------|---------------------|-------------------|
| (a) Application Layer | (b) Transport Layer | (c) Network Layer |
| (d) Datalink Layer | (e) Physical Layer | |

- 6). Given a channel with a data rate of 1 kilobit per second (kbps), what is the maximum number of bits that can be transmitted over this channel in one second?

(a) 125 bits	(b) 1000 bits	(c) 1024 bits
(d) 8000 bits	(e) 8192 bits	

- 7). What is the typical use case or benefit associated with a web browser storing a cookie on a user's system?

(a) Boosts internet speed by increasing bandwidth
(b) Ensures antivirus protection for the user
(c) Track your activities on the web
(d) Automatically updates web browser software
(e) Improves the computer's processing speed

- 8). What is the primary purpose of the twists in twisted pair cables, and what benefits do they provide?

(a) To improve the flexibility of the cable for easier bending
(b) To enable the cancellation of radiation from the wires to reduce the noise
(c) To increase the strength of the wires for durability
(d) To make cable management easier by preventing tangling
(e) To enhance data transmission speed by reducing resistance

- 9). Which of the following frequency ranges fall within the ISM (Industrial, Scientific, and Medical) band?

(a) 450 MHz - 470 MHz	(b) 900 MHz - 950 MHz	(c) 2.4 GHz - 2.4835 GHz
(d) 3 GHz - 3.5 GHz	(e) 5 GHz - 5.1 GHz	

- 10). What is the maximum data rate achievable on a 1000 kHz noiseless channel using a binary signalling scheme?

(a) 500 bps	(b) 1000 bps	(c) 1000 kbps
(d) 2000 kbps	(e) 4000 kbps	

- 11). What term is used to describe communication links that allow data transmission in both directions, but only one direction at a time?

(a) Full-duplex	(b) Half-duplex	(c) Simplex
(d) Multiplex	(e) Demultiplex	

- 12). When the spectrum of a communication channel is divided into frequency bands, with each user having exclusive access to a specific band for transmitting their signal, this technique is known as?

(a) Frequency Division Multiplexing
(b) Time Division Multiplexing
(c) Frequency Shift Keying
(d) Frequency filtering
(e) Statistical Time Division Multiplexing

- 13). Which of the following statements best describes Forward Error Correction (FEC)?

(a) It is the technique of forwarding the frame to the next hop without correcting errors.
(b) It is a method to detect errors at the receiver and inform the sender.
(c) It refers to including a checksum in the data.
(d) It refers to the technique of including enough extra information in the frame so that the receiver can correct the errors.
(e) It corrects errors before sending the data.

- 14). In an error-handling system, r check bits are added to an m -bit message before transmission. What is the code rate of this system?

(a) $\frac{m}{r}$	(b) $\frac{r}{m}$	(c) $\frac{m}{r-m}$
(d) $\frac{m-r}{m+r}$	(e) $\frac{m}{m+r}$	

- 15). If the minimum Hamming distance between any two valid code words in a given code is 5, what is the maximum number of errors that can be detected using this code?

(a) 1	(b) 2	(c) 3
(d) 4	(e) 5	

16). Which one of the following statements is correct regarding the parity bits?

- (a) Even parity is better than odd parity.
- (b) Odd parity can be used only if there is an odd number of bits in the message.
- (c) Even parity bit can be calculated by taking the XOR operation of all the bits in the message.
- (d) Odd parity bit is equal to the even parity bit.
- (e) Even parity can be used only if there is an even number of bits in the message.

17). What is the primary purpose of a checksum in data transmission?

- (a) As an acknowledgement
- (b) Correct some errors
- (c) Correct all possible errors
- (d) Detect errors
- (e) For flow control

18). What is the vulnerable period for a frame of similar size in slotted ALOHA, given that the vulnerability period in pure ALOHA is T ?

- | | | |
|------------|-------------------|---------|
| (a) $2T$ | (b) $\frac{T}{2}$ | (c) T |
| (d) $1.5T$ | (e) $3T$ | |

19). Which of the following statements correctly describes the role of the management plane in networking?

- (a) Keeps the forwarding table updated.
- (b) Enables network administrators to manage and oversee network operations effectively.
- (c) Manages the active topology of the network.
- (d) Handles packet buffering, scheduling, header modification, and forwarding.
- (e) Consists of ports used for the reception and transmission of packets.

20). Which component of Software-Defined Networking (SDN) allows the controller to program network devices at Layer 3?

- | | | |
|--------------------|----------------------|------------------------------|
| (a) Data Plane | (b) SDN Applications | (c) Network Operating System |
| (d) Northbound API | (e) Southbound API | |

21). What is the purpose of implementing routing in hardware tables at the network layer?

- (a) Improve network maintainability.
- (b) Enable centralised configuration of the network.
- (c) Allow enforcement of policies across the network.
- (d) Keep the high-speed links and route packets at link speeds.
- (e) Provide a complete view of the network topology.

22). What file was used in ARPANET to store computer names and their corresponding IP addresses?

- | | | |
|----------------|-----------------|---------------|
| (a) DNS.ZONE | (b) NETMAP.TXT | (c) HOSTS.TXT |
| (d) ARP.CONFIG | (e) HOSTMAP.DAT | |

23). Which library procedure does an application program call to resolve a domain name into an IP address?

- | | | |
|-----------------|--------------|----------------|
| (a) Transformer | (b) Resolver | (c) Translator |
| (d) Converter | (e) Mapper | |

24). Which tuple in a resource record indicates the stability or reliability of the record?

- | | | |
|-----------------|-----------|------------------|
| (a) Domain_name | (b) Class | (c) Time_to_live |
| (d) Type | (e) Value | |

25). What is the term for a third-party code module installed as an extension to a web browser?

- | | | |
|-------------------------|---------------|-----------|
| (a) Extras | (b) Utilities | (c) Tools |
| (d) Helper applications | (e) Plug-in | |

_____ ***** _____